PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

November 23, 1887.—Prof. J. W. Judd, F.R.S., President, in the Chair.

The following communications were read:—

1. "Note on a New Wealden Iguanodont, and other Dinosaurs." By R. Lydekker, Esq., B.A., F.G.S.

The new species of *Iguanodon* was founded upon a left ilium and ischium, parts of the pubis and tibia, two metatarsals, several dorsal, lumbar, and caudal vertebræ and other bones, obtained by Mr. C. Dawson, F.G.S., from the Wadhurst clay of the Hastings Sand. The species now described, which was named after the discoverer, and *Iguanodon Prestwichi*, were shown to form a peculiar and aberrant group of the genus *Iguanodon*. A maxilla from the Wealden of the Isle of Wight was also described and referred to *Ornithopsis*.

The recent examination by the author of the remains of Dinosauria in the British Museum for the purpose of preparing a Catalogue, had enabled him to make several notes on the various forms represented in the collection, and these notes were embodied in the present paper. The principal subjects mentioned were the following:—The identification of *Iguanodon Seeleyi* with *I. bernissartensis*; the genera *Sphenospondylus* and *Cumnoria* of Prof. Seeley; a British species of *Trachodon* from the Cambridge Greensand; an ilium, provisionally referred to *Hylæosaurus*, from Cuckfield; the genera *Vectisaurus* and *Regnosaurus*; the relations of the Sauropoda and Theropoda; the type specimen of *Ornithopsis Hulkei*; the similarity of the humerus in *Pelorosaurus* and *Brontosaurus*; the vertebræ and other remains of *Cetiosaurus brevis*: the humerus of *C. humerocristatus* and its relations to *Ischyrosaurus*, Hulke, *Gigantosaurus*, Seeley, and *Ornithopsis Leedsii*, Hulke; the affinities between *Cetiosaurus oxoniensis* and *Morosaurus*; the occurrence of *Titanosaurus* in the Wealden of England and the possible identification of that genus with *Dinosaurus* of Owen; the vertebræ described by Owen as *Bothriospondylus magnus*; the types of the genera *Thecospondylus* and *Bothriospondylus*; and some Megalosaurian teeth.

2. "On the Cae-Gwyn Cave." By T. M'Kenny Hughes, M.A., F.G.S., Woodwardian Professor of Geology, Cambridge.

The subject fell into two divisions: the Age of the Drift outside the Cave, and the relation of the deposits in the cave to that Drift. The Author contended that the drift outside the cave was a

marine deposit *remanié* from older beds of glacial age, but was itself postglacial and of approximately the same date as the St.-Asaph drift; in confirmation of which he gave the following list of shells from that drift outside the cave:—*Ostrea edulis*, *Pecten varius*, *Mytilus edulis*, *Cardium echinatum*, *C. edule*, *Cyprina islandica*, *Astarte borealis*, *A. sulcata*, *A.* var., *Venus gallina*, *Tellina balthica*, *Psammobia ferroensis*, *Mya truncata*, *Fissurella græca*, *Littorina littorea*, *Turritella terebra*, and *Buccinum undatum*; pointing out that there was only the one species of *Astarte* among them which was not common on the adjoining coast, just as there were in the older postglacial river-gravels of the S.E. of England two locally extinct forms, the *Corbicula fluminalis* and the *Unio littoralis*, and discussing various difficulties, stratigraphical and palæontological, in the way of accepting the view that the cave-deposits were glacial, interglacial, or preglacial. For instance, he remarked that there were no marks of glaciation on the face of the rock in which the cave occurred; that the cave-deposits were like drift because derived from it, but that no continuity existed between the drift and the cave-deposits; that there was a much greater thickness of rain-wash and resorted marine-drift looped down over the upper opening into the cave than over the adjoining surface. The upper part of this resorted drift is exactly similar to the material which had accumulated against the old fence, the very existence of which had been denied. The swallow-hole action to which he referred the phenomena was proved by the opened fissures and vertical cylindrical holes in the limestone and by the occurrence of a land-shell (*Zonites cellarius*). He held that there had been a break-down of the roof and wall of the cave under the drift, and that angular masses of limestone, due to this cause, were found all along in front of the upper opening to the cave. No bones were found outside that barrier, there being no bones in the shell-bed and no shells in the bone-bed except the land-shell washed down through a fissure.

Instead, therefore, of the difficult task of proving that there were in the district many well-known processes connected with subterranean denudations, which might explain the superposition of the marine drift upon the bone-earth, each of which had played a part in producing the results observed, he maintained that we had now the clearest evidence as to the exact manner in which it was all brought about, namely, that the marine drift was deposited before the occupation of the cave by the animals whose remains have been found in it; that at the time of the occupation of the cave the upper opening now seen did not exist, but the animals got in by the other entrance; that against the wall of the cave where it approached most nearly to the face of the cliff the drift lay thick as we now see it; that by swallow-hole action the cave was first partially filled, and then the thinnest portion of its wall gave way gradually, burying the bone-earth below it, and letting down some of the drift above it, so that some of it now looks as if it might have been laid down by the sea upon preexisting cave-deposits.

December 7, 1887.—Prof. J. W. Judd, F.R.S., President, in the Chair.

The following communications were read:—

1. "On the Discovery of Trilobites in the Upper Green (Cambrian) Slates of the Penrhyn Quarry, Bethesda, near Bangor, North Wales." By Dr. Henry Woodward, F.R.S., V.P.G.S.

The absence in Wales of organisms in the Longmynd and Harlech group renders any discovery of fossils in beds of this early horizon of the utmost importance.

A portion of a Trilobite (*Palæopyge Ramsayi*) and Annelide burrows had already been found; but Dr. Hicks, at St. Davids, has added a sponge, 2 Ostracods, 6 Trilobites, 2 *Lingulellæ*, and 2 *Thecæ* (*Agnostus*, *Plutonia*, *Paradoxides*, *Conocoryphe Lyelli*, *C. bufo*, and *Microdiscus sculptus*).

Dr. Hicks has pointed out the singular absence of organic remains in the Longmynds in Shropshire, N. Wales, and Ireland, and has urged the need of further explorations. As if in answer to this, the Author has received from Prof. Dobbie an impression and counterpart of a Trilobite from Bethesda, near Bangor, about $3\frac{1}{2}$ in. long and $1\frac{3}{4}$ in. broad, also the head of a second specimen of the same species. These specimens were obtained from the Upper Green bed of the quarry, which immediately underlies the grits forming the brow of Bronllwyd and above the Purple Slates. The glabella is marked by three oblique furrows on each side, the cheek-sutures are very obscure, and the eyes, which are minute (probably rudimentary), occupy the centre of the free cheek, the suture obliquely dividing the free cheek from the fixed. The outline of the head is rounded. There are fourteen free thoracic segments. The pygidium consists of about three coalesced somites.

Comparing the Bangor fossil with *Paradoxides*, we find that *Paradoxides* has about twenty free segments.

Asaphus, *Ogygia*, and *Niobe* have only eight thoracic rings, and the caudal shield is very large.

Angelina agrees with the Bethesda specimen in the number of its free segments; but the glabella is smooth, the pleuræ are broader, and the cheek-spines very long.

Olenus has fourteen rings; the glabella is furrowed, but the head-shield is shorter and broader, and the ends of the pleuræ and margin of the caudal shield are usually produced into spines. *Olenus* is also smaller.

Conocoryphe has fourteen free segments; the axis is parallel-sided, and does not diminish backwards from the head to the pygidium: each ring of the axis is notched on its posterior border, and the ends of the pleuræ are rounded; the glabella is furrowed obliquely; the eyes are often wanting or are minute.

From these considerations the Author considered the Bangor fossil to be referable to *Conocoryphe*, and to a new species, *C. viola*.

The Trilobite was found by Robert E. Jones and Robert Lloyd, two quarrymen, at Bethesda. Afterwards Prof. Dobbie found a detached head of the same species near the spot where the original was obtained. The Author desired to return thanks to Prof. J. Dobbie, of the University College of North Wales, Bangor, for the opportunity of describing these specimens.

2. "On *Thecospondylus Daviesi*, Seeley, with some Remarks on the Classification of the Dinosauria." By Prof. H. G. Seeley, F.R.S., F.G.S.

The Author described the anterior third of a vertebra from the Wealden, which was recognized by Mr. Davies as the cervical vertebra of an animal allied to the genus *Cœlurus*, Marsh. The only European genus hitherto described in which the vertebræ are similarly elongated, compressed, and enveloped in a dense external film of bone is that indicated by the sacrum, named *Thecospondylus Horneri*, whose vertebræ are about 11 centimetres long, whilst the cervical vertebræ now under discussion were 9 centimetres long when complete. The specimen has lost the prezygapophyses and cervical ribs. If these were restored they would probably approximate in shape to those of *Cœlurus fragilis*.

The Author gave an outline-restoration. The points of resemblance were chiefly the elongated form, lateral compression of centrum and neural arch, inclined articular face of centrum, mode of attachment of the ribs, the convex external surface of the neural arch, almost total suppression of the neural spine, and the thin texture of the bone. But this affinity does not amount to generic identity, and he indicates the points of difference. In estimating the resemblance to *Thecospondylus* he regards the thinness of the investing layer of bone, the smoothness of its internal surface, the elongation and lateral compression of the vertebræ, and a certain general approximation in form: the most remarkable difference is the absence from the cast of *Thecospondylus Horneri* of indications of films of bone, or evidence of internal plates, such as are seen in the present specimen. The Author observed that Prof. Marsh regards *Cœlurus fragilis* as a generalized Sauropsid, with more resemblance to Dinosaurs than to Pterodactyles.

Professor Marsh has formed an Order, Sauropoda, which includes *Cetiosaurus* and *Ornithopsis*. The Author remarked that he had already suggested Cetiosauria as separable from the rest of the Dinosaurs. When an additional Order is instituted for animals with cavernous or pneumatic vertebræ, the Theropoda of Marsh, under which *Cœlurus* is grouped, it becomes necessary, in order to determine the systematic position of *Thecospondylus*, to review its relations. The Author would unite Sauropoda with Theropoda into one Order, the Saurischia, whose pneumatic skeleton is an approximation towards Ornithosaurs and Birds.